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DRUG PREPARATION IN REFFERRAL HOSPITAL

By : Sarjaini Jamal *) Muchtaruddin *)

A B S T R A C T

Suatu penelitian yang bertujuan menyusun daftar obat yang dapat dan perlu dibuat di Rumah Sakit Kelas A dan Kelas B disertai dengan cara pembuatan, tenaga, peralatan, dan ruangan yang diperlukan telah dilakukan oleh Pusat Penelitian Farmasi pada tahun 1981.

Berbagai informasi telah dikumpulkan dari seluruh Rumah Sakit Kelas A (2 buah), Rumah Sakit Kelas B (14 buah) dan dari berbagai literatur yang berkaitan dengan pembuatan obat.

Berdasarkan hasil kuestioner dan observasi langsung di kedua kelas Rumah Sakit ini dapat disimpulkan, bahwa sebanyak lebih dari 200 obat telah dibuat untuk memenuhi kebutuhan sendiri dan proses ini sudah lama berlangsung. Obat tersebut terdiri dari berbagai bentuk dan jenis sediaan yang antara lain adalah : cairan untuk obat minum dan obat luar, serbuk tabur dan serbuk minum salep kulit dan mata, obat tetes mata, hidung dan telinga, berbagai kapsul Antibiotika, berbagai obat suntik dan infus, antikoagulasi darah serta beberapa sediaan alergen.

Berdasarkan pembatasan-pembatasan yang dilakukan dalam penelitian ini yaitu karena tidak tersedia atau tidak dijual di jalur-jalur pemasaran obat harus dibuat segar (recentus paratus) dan banyak Rumah Sakit yang membuatnya, telah terpilih 77 obat yang dianjurkan dibuat di Rumah Sakit kelas A dan B. Obat-obat tersebut adalah antara lain : Solutio Acidi Borici, Alkohol 70 %, Tinctura Jodii, Solutio Permangas Kalicus, Salep Antiscabies dan Infus Bicarbonas Natricus 7,6 %.

Cara pembuatan, tenaga dan peralatan serta ruangan yang dibutuhkan tidak dibicarakan dalam tulisan ini.

INTRODUCTION

It is assumed that drug preparation is performed in all Referral Hospitals. However if a standard could be provided to be used as a guideline for drug preparation in these hospitals, the production of drugs by hospitals could increase the economic benefit, utilization of manpower and other facilities of the hospitals.

Based on this assumption, in 1981 the Pharmaceutical. Centre arranged a survey about drug preparation in 16 Referral Hospitals.

The objective of this study is to provide a standard drug list consisting of names of drugs, which can be produced by Referral Hospitals in checking their methods of production and requirements for manpower, equipment and working space. This paper will only discuss the standard drug list.

A questionnaire with its guidance was used to collect data from 2 Class A Hospitals and from 14 Class B hospitals. Other informations such as literature and experience of research workers have been used to fulfil the objective. Many Pharmacists, Medical Doctors and Assistant Pharmacists have joined in this study.

MATERIALS AND METHODS

Class A hospitals and Class B Hospitals have been visited by a research worker for 5 days. Information about drug production (e.g. Drug list or Formulary, Apparatus, Method of production of drugs, Manpower, Working space and others) was obtained through Pharmacists and Assistant Pharmacists at the Pharmaceutical Department of the respective hospitals.

*) Staff members of The Pharmaceutical Research Centre, Jl. Percetakan Negara I, Jakarta.

A Questionnaire with its guidance was used for data collecting. Data processing was done manually by feeding data into dummy tables, which were prepared depending on variables influencing drug production in the hospitals.

The drug list consisted of drugs which fulfilled several criteria, i.e. not available on the market, should be prepared fresh or recentus paratus, produced and utilized in two or more hospitals.

RESULTS

Analysis of data obtained from the hospitals reveals the following :

1. Drug production is performed in all Hospitals. See Table 1.
2. Only 44 % of the Hospitals have Formularium of drugs. See Table 2.
3. 20 – 94 items of drugs can be produced in the Hospitals. See Table 3.
4. A maximum of five Pharmacist and 3 – 41 Assistant Pharmacists are working at the Pharmaceutical Department of the Hospitals. See table 4.
5. Only once balance is present in each Hospitals. No hospitals are provided with complete apparatus for drug production. See table 5.

DISCUSSION AND CONCLUSION

There are 16 Referral Hospitals in Indonesia. The Hospitals consist of 2 class A Hospitals and 14 Class B Hospitals.

Class A Hospitals are provided with specialists as medical staff (e.g. in Surgery, Internal medicine, Pediatry, Obstetry & Gynaecology, Psychiatry, Neorology, Anaesthesiology, Radiology, Dentistry, Forensic medicine, Public health, Clinical pathology, Physiotherapy, Nutrition, Pathological anatomy).

Beside the above mentioned specialists, there are staff members, who are super specialists. They are only available in two Referral Hospitals in Indonesia, one in Jakarta and one in Surabaya, each with about 1300 beds.

Class B Hospitals are provided with a similar category of medical staff as that for class A Hospitals, but whith out super specialist. Each Hospital has 500 – 1000 beds.

The number of hospitals producing drugs can be seen in Table 1. There is no correlation between the hospitals and the drug production. Two hundred kinds of drugs are being produced. It is shown in this study that many drugs can be produced by the hospitals.

Table 3 shows the number of hospitals producing drugs. Only one hospital could produced 80 – 94 drugs and 5 hospitals could produced 50 – 64 drugs. The drugs produced per hospital depend on the needs the activities and availability of equipment for drug production. No correlation was observed between the existence of a formularium in the hospitals and the drug production in the hospitals.

The number of Pharmacists and Assistant pharmacists existent in hospitals depends on the requirements of drugs needed. Table 4 shows that a varation of 1 – 5 Pharmacists and 2 – 41 Assistant Pharmacists are existent in the various hospitals. This would mean that an average of 7 Assistant Pharmacists are available to assisst one Pharmacist.

An analysis on the efficiency of Pharmacists and Assistant Pharmacists in hospitals revealed an ideal ratio of 1 : 5. Joenoes N.Z and Soetojo D. concluded that the ratio of Pharmacists to Assistant Pharmacists in hospitals should be 1 : 3. A drug should not be available on the market, produced in fresh form or recentus paratus and prepared by at least 2 hospitals, before it can be listed.

There are 77 drugs suggested to be made in class A and Class B hospitals. See Annex 2.

ANNEX : 1

Table 1 Drug production in Class A and B Hospitals.

Class of Hospitals	Number of Hospital		Total
	Produce drug	Not produce drug	
A	2	–	2
B	14	–	14
Total	16	–	16

Table 2 Number of Hospitals possess Formularium of Drugs :

Class of Hospitals	Number of Hospital which		Total
	Possess Formularium	do not possess Formularium	
A	2	–	2
B	5	9	14
Total	7	9	16

Table 3. Number of drugs to be produced in Class A and Class B Hospitals.

Number of Drugs	Number of Hospitals		Total
	Class A	Class B	
20 – 34	–	4	4
35 – 49	1	3	4
50 – 64	1	4	5
65 – 79	–	2	2
80 – 94	–	1	1
Total	2	14	16

Table 4. Number of Pharmacists and Assistant Pharmacists active at the Pharmaceutical Department of the Hospitals.

Hospitals		Number of		Total
		Pharmacists	Assistant Pharmacists	
Class A	1	3	41	44
	2	5	35	40
Class B	1	1	2	3
	2	2	14	16
	3	1	8	9
	4	2	16	18
	5	1	3	4
	6	1	5	6
	7	4	6	10
	8	2	3	5
	9	1	16	17
	10	2	24	26
	11	2	17	19
	12	1	5	6
	13	1	9	10
	14	1	6	7
Total	16	30	210	240

Table 5. Number of Hospitals possess apparatus for drug production

Apparatus	Number of Hospital		Total
	Class A	Class B	
1. Balance	2	14	16
2. Mixer	–	10	10
3. Tablets machine	–	–	–
4. Sterilisator	2	9	11
5. Aquadestilator	2	8	10
6. Capsula filling machine	1	5	6
7. Suppositories casting mould	–	2	2
8. Ointment tube filling machine	–	–	–
9. Ampuls filling machine	1	2	3
10. Vials sealing machine	1	6	7
11. Ampuls washing machine	1	–	1
12. Botles washing machine	1	1	2
13. Others	1	6	7

ANNEX : 2 NAMES OF DRUGS SUGGESTED TO BE PRODUCED IN REFERRAL HOSPITALS.

A. Solution.

1. Acid Borici solutio (Solutio Acidum Boricum)
2. Aethanolum 70 %
3. Alumi Plumbi Acetatis Solutio
4. Benzil Benzoas lutio
5. Boroglyceroli solutio
6. Boorschmid mixture
7. Camphorae Spirituosa 10 %
8. Catether Vloistof
9. Charcot Solutio
10. Chloralhydras Solutio 5 % and 10 %
11. Phenolum Liquefactum
12. Formaldehyde solutio 5 % and 10 %
13. Gargarisma Khan
14. Gentian Violet
15. Hydrargiri Bichloridi 0,1 %
16. Hydrogen Peroxyde 3 %
17. Instrument Vloistof
18. Jodii Spirituosa solutio
19. Julapium
20. Kalii Permanganas solutio
21. Kalium Chloride syrup 6 % and 10 %
22. Carboglycerine.
23. Kumerfeldi solutio
24. Lugoli solutio
25. Mercurochrom 2 % and 3 %
26. Potio Alba Contratusin
27. Potio Nigra Contratusin
28. Parafin Liquidum
29. Argenti Nitras Solutio 0,5 % and 4 %
30. Resiguard 6 % loco
31. Rivanoli solutio 0,1 %
32. Salicylspirituosa
33. Syrupus Thymi
34. Mantoux 1 : 100
35. Mantoux 1 : 2.000
36. Mantoux 1 : 10.000

B. Eye drops, Ear drops and Nasal drops.

1. Zinci Sulfas eye drop
2. Chloramphenicol eye drop
3. Sulfacetamide eye drop
4. Chloramphenicol ear drop
5. Pantocain HCl ear drop
6. Ephedrine nasal drop.
7. Protargol – Ephedrine nasal drop.

C. Oral and external Use powders

1. Cough remedies powder
2. Cold remedies powder
3. Asthma powder

4. Antidiare powder
5. Boorzuur talc
6. Dermatol Boorzuur talc
7. Permanganas Kalicus Kristal 27 mg and 1 g
8. Antacid powder
9. Salicyl talc

D. Skin Oinment and Eye Oinment

1. AAV 1 Skin Oinment
2. AAV II Skin Oinment
3. ABOS Skin Oinment
4. Antiscabies Oinment
5. Boric Acid 10 % Oinment
6. Boric Acid Lanolin Oinment
7. Boor Zine Oinment
8. Brandsmeersel (FMI)
9. Pasta Zinci Oleosa
10. Ichtyoli oinment
11. Salicylic acid oinment
12. Cod liver oil oinment
13. Zinc Oxyde oinment
14. Tettracycline skin oinment
15. Chloramphenicol eye oinment
16. 2 – 4 oinment
17. Whitfield oinment

E. Injection And Infuse Preparates

1. Bicarbonas Natricus solutio 7,6 % and 8,4 %
2. Aqua destillata steril 900 ml and 1000 ml
3. Glucose Electrolite (solutio A + B) 500 ml
4. Praeparate for Haemodialysis
5. Methylen Blue 2 %
6. Natrii Chloridi solutio 0,8 %
7. Ringer solutio 0,8 % (BPC)
8. 3 A solutio 500 ml